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Author: Andrew E. Gallegos		

ENVIRONMENTAL RESTORATION PROJECT

A Department of Energy
Environmental Cleanup Program

Environmental Restoration Project
Quality Procedure

for

Design Review

Los Alamos
NATIONAL LABORATORY
Los Alamos NM 87545

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Revision Log

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R0	9/9/02	Andrew E. Gallegos	New Procedure	All

Design Review

Table of Contents

Design Review

1.0 PURPOSE

This quality procedure (QP) states the responsibilities and describes the process for implementing and managing the design review process within the ER Project.

2.0 SCOPE

2.1 All **ER Project personnel** shall implement this mandatory SOP when implementing and managing the design review process for the ER Project.

2.2 Subcontractors may follow this SOP for implementing and managing the design review process.

OR

2.3 **Subcontractors** may use the subcontractor's procedure as long as the substitute meets the requirements prescribed by the ER Project Quality Management Plan, and the Environmental Restoration (ER) Project's Quality Program Project Leader (QPPL) and an ER technical staff person approve the procedure before starting designated activities.

3.0 TRAINING

3.1 **ER Project personnel** shall train to and use the current version; contact the author if the SOP text is unclear.

3.2 **ER Project personnel** using this QP shall document training in accordance with LANL-ER-QP-2.2, Personnel Orientation and Training; the training database is located at http://erinternal.lanl.gov/Training/login.asp.

3.3 The responsible **supervisor** shall monitor the proper implementation of this procedure and ensure that the appropriate personnel complete all applicable training assignments

4.0 DEFINITIONS

4.1 *Conceptual Design*—A pre-Title I activity that incorporates conceptual design estimates, conceptual design plan, conceptual project schedule, conceptual design report, and a constructability review.

4.2 *Conceptual Design Estimate*—A budget estimate that is required when requesting authorization for funding of construction projects.

4.3 *Conceptual Design Plan*—A pre-authorization activity that describes the basis for the conceptual design.

4.4 *Conceptual Design Report (CDR)*—A document that describes the project in sufficient detail to produce a budget cost estimate and to evaluate the merits of the project.

4.5 *Conceptual Project Schedule*—A schedule that is developed during pre-authorization activities and is based on the conceptual design of a project.

4.6 *Constructability Review*—A formal review to determine the feasibility of constructing a proposed project.

4.7 *Definitive Design*—Design documents and processes defined in Title II Design (e.g., drawings, specifications, bidding documents, cost estimates, and coordination with all parties that might affect the project; development of firm construction and procurement schedules; and assistance in analyzing proposals or bids.

4.8 *Design*—The set of approved plans, criteria, procedures, specifications, and drawings governing all work on the project. This includes construction contracts, contractor purchase orders, and industry codes and standards invoked by the design.

4.9 *Design Agent*—The organization assigned the responsibility for formulation of the design in accordance with established plans and procedures. Normally this is an Architect/Engineer or a Construction Contractor.

4.10 *Design Bases*—That information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design. These values maybe be:

- Restraints derived from generally accepted "state-of-the-art" practices for achieving functional goals; or
- Requirements derived from analysis (based on calculations and/or experiments) of the effects of a postulated accident for which a structure, system, or component must meet its functional goals.

4.11 *Design Change*—A change to drawings, specifications, or other design documents used to make physical changes to structures, systems or components; or a non-physical change to documents to provide documentation of changes to specifications, design inputs, set-points, as-built information, or changes to address nonconforming items dispositioned for "use-as-is" or "repair" issues. Design changes controlled by this procedure may occur prior to, during, or after construction.

4.12 *Design Documents*—Technical documents, including technical design reports, design drawings, specifications, and criteria documents that govern the performance of design and construction activities.

4.13 *Design Inputs*—Those criteria, parameters, design bases, regulatory requirements, contractual requirements, customer expectations or other design requirements upon which detailed final design is based and are found to be technically correct and complete. Design inputs may include design bases, health and safety considerations, expected life cycle, performance parameters, codes and standards requirements, reliability requirements, standard engineering data, general engineering knowledge, and specific sources of controlled data, as follows:

- Standard engineering data consists of commonly available engineering properties (e.g., structural steel shapes, common pipe dimensions, water properties etc.).
- General engineering knowledge consists of basic engineering fundamentals (e.g., Ohm's Law, structural beam moment calculation, and Bernoulli Equations), and
- Specific sources of controlled data that include written and traceable input. This information includes other technical design calculations, drawings, codes, standards, specifications, safety analysis reports, as-built walkdown reports, technical papers, manufacturer's data, and other supporting information.

4.14 *Design Output*—Technically correct design documents that meet the end-user's requirements such as drawings and specifications, test and inspection plans, maintenance requirements, report and other documents which are used to define and support technical requirements of structures, systems components, and material used during fabrication and/or construction and computer programs. Design output documentation may include as-built drawings and shop drawings that verify actual configuration of design implementation.

4.15 *Design Process*—Processes that translate design input into design output documents that are technically correct and are compliant with the end-user's requirements. Design processes address aspects critical to the performance, safety, or reliability of the designed items (e.g., dose and risk assessments, procurement, manufacturing, assembling, construction, testing, inspection, maintenance, and decommissioning).

4.16 *Design Reviews*—A documented, traceable, review consisting of examination, comments, evaluation, and resolution that ensures any given design clearly, accurately, and completely describes the technical requirements of the item and to verify the detailed design is maintained within the requirements specified in baseline documents. The number of reviews and level of Design Review Team participation shall be based on Title I, II and III requirements, project type, and stage of the project.

Note: Focus is on compliance with design criteria, codes, regulations, DOE Orders and standards, the Los Alamos National Laboratory (LANL) Engineering Manual, located at FWO-FE Manual Set Index Page (external), and standards of practice; adequacy to economically fulfill the intended operational functions; and constructability and maintainability.

4.17 *Design Review Team*—A group that does not have direct responsibility for developing the design being reviewed, and comprised of:

- A minimum of two, non-rotating (permanent) senior representatives from the ER Project Functional Area responsible for design implementation.
- A Quality Liaison assigned to the project.
- Task Leader.
- Safety.
- Regulatory Compliance.
- The University Technical Representative (UTR).
- Discipline Representatives for each discipline included within the design to be reviewed.
- Additional reviewers may include Water Quality, Air Quality etc. who will review and approve design documents. Team members may be assigned more then one responsibility (e.g., UTR may also be a Task Leader).

4.18 *Design Review Manager* —The person appointed by the Team Leader and concurred by the ER Program Manager to coordinate a design review. The design review manager is not directly responsible for the design under review.

4.19 *Design Verification*—A formal process of consisting of technical reviews, peer reviews, alternate calculations, and qualification testing which may include previous verifications of similar designs or verifications of similar features of other designs. Design verification may also incorporate inspections, acceptance testing, assessments, or otherwise determining and documenting whether items, processes, services, or documents conform to specified requirements.

4.20 *Discipline Representative*—LANL subject matter experts that serve both as technical resources and design reviewers. Qualifications are established through documented education, training, and experience. They represent disciplines such as architecture, civil engineering, structural engineering, seismic engineering, mechanical engineering, electrical engineering, LANL Authority Having Jurisdiction (AHJ), fire protection and life safety, utilities, environmental safety and health, maintenance, security, user operations, facility management, etc. The LANL Engineering Manual Point of Contact

(POC) for each relevant discipline may be contacted for assignment of Discipline Representative reviewers.

4.21 Engineer of Record—The engineer (individual or organization) under whose direction and continuing supervision design work is performed.

4.22 *Graded Approach*—A quality affecting process that assigns the scope, depth, and rigor of a management system's application of requirements to a specific activity Refer to LIR 230-01-02, Graded Approach for Facility Work, located at Official Documents | Inside Los Alamos National Laboratory.

The "graded approach" shall be considered for the

- selection of controls and verifications applied to various items and activities consistent with their importance to quality, safety, cost, schedule, and success of the activity;
- relative importance to safety, safeguards, and security;
- magnitude of any hazard or risk involved;
- life-cycle of a facility;
- impact/consequences on programmatic mission of a facility;
- particular characteristics of a facility or activity;
- nuclear safety classification or hazard category of the item or activity;
- adequacy of existing safety documentation;
- complexity of products or services involved; and
- history of problems at a site or facility.

Note: "Facility may be defined as a tank, a building, a waste site, or a laboratory." (DOE Records Schedule for Environmental Records Introduction)

4.23 *LANL Authority Having Jurisdiction*—A LANL organization, group or facility manager responsible for fire protection and life safety, utilities, environmental safety and health, maintenance, security, user operations, facility management, etc.

4.24 *Quality Liaison*—An ER Project individual designated by the Quality Program Project Leader to participate as a member of the Design Review Team.

4.25 *Task Leader* —The LANL individual who has been assigned responsibility for the coordination and direction of the design document preparation (typically the UTR).

4.26 *Title I Design*—The preliminary stage of project design in which design criteria are defined in greater detail to permit the design process to proceed with the development of alternate concepts as a Title I design summary, if required.

4.27 *Title I Design Estimates*—An intermediate estimate used to verify that the Title I design details still remain within the project funding.

4.28 *Title II Design*—The definitive stage of project design in which the approved Title I concept and the supporting documentation prepared for Title I forms the basis of all activity in Title II.

4.29 *Title II Design Estimates*—The estimates used to certify bids or to be used in contract negotiations. As Title II design specifications and drawings are developed, the Title II estimate is completed.

4.30 *Title III Design*—The inspection portion of project engineering, design and inspection that include the engineering and design activities in Title I and Title II (e.g., configuration management, inspection and acceptance testing of installed equipment, systems and completed construction etc.).

4.31 *Technical Expertise/Competency Evaluation*—A documented process implemented by a Functional Area Group Leader to determine the competency and technical expertise (e.g., related background, education and experience) of a potential design review team member.

5.0 RESPONSIBLE PERSONNEL

The following personnel are responsible for activities identified in this procedure:

- Design Agent
- Design Manager
- Design Review Manager
- Design Team
- Discipline Representative
- ER Program Manager
- ER Project Personnel
- Project Team Leader (formerly Focus Area Leader)
- Quality Liaison
- Quality Program Project Leader
- Reviewer
- Review Team Members (Team)
- Subcontractor
- Supervisor
- Task Leader
- University Technical Representative

6.0 REFERENCES

To implement properly this QP, ER Project personnel should become familiar with the contents of the following documents, located at http://erinternal.lanl.gov/home_links/Library_proc.shtml.

- ER Project Quality Management Plan
- LANL-ER-QP-2.2, Personnel Orientation and Training

- LANL-ER-QP-3.2, Lessons Learned
- LANL-ER-QP-4.4, Record Transmittal to the Records Processing Facility
- LANL-LIR 230-01-02, Graded Approach for Facility Work located at Official Documents | Inside Los Alamos National Laboratory
- LANL-LIR-220-03-01, Facility Engineering Manual, located at FWO-FE Manual Set Index Page (external)

7.0 PROCEDURE

7.1 Select the Design Review Team

7.1.1 The **Team Leader** responsible for the design shall assign design review manager responsibilities to an individual that is independent of the design under review.

7.1.2 The assignment of the design review manager shall be with the express concurrence of the ER Program Manager.

7.1.3 Respective **Team Leader** responsible for the design shall select the ER Project Design Review Team members with the express concurrence of the **ER Program Manager**.

7.1.4 The **Team** shall not have direct responsibility for designs under review.

7.1.5 The **Team** shall serve on a permanent basis until replaced by their respective Team Leader.

7.1.6 The respective **Team Leader** shall submit a summary (Attachment A) of qualifications to the ER Program Manager for each Team nominee for review and approval.

Note: This requirement may be satisfied by submission of a statement of experience in the area of review (e.g., engineering, safety, construction management, quality etc.) that was verified and documented (e.g., email, letter to file, memorandum etc.) by the responsible **Team Leader**. Each review Team member shall have a minimum of five years of experience within respective fields of review.

7.1.7 The **Team** shall have no superiors for purposes of review and shall have right of authority for their own comments (i.e., the review is conducted independently without direction by superiors). Any conflicts (e.g. review comments) that arise shall be resolved in accordance with other sections of this procedure.

7.1.8 The **Design Review Manager** shall organize, facilitate, and direct the Team.

7.1.9 The **Design Review Manager** shall have the authority to obtain the services of specialized or “expert” reviewers on an as-needed basis.

7.1.10 The **Team** may draw, as needed, on the expertise of individuals within their own Functional Area while performing their reviews and formulating comments. Comments and signatures of Team members shall represent the consensus of their respective organizations.

7.2 Initiate Design Review Manager Processes

7.2.1 The **Design Review Manager** shall ensure design reviews are performed at the stages of Work Package development indicated in Attachment E and as determined by conceptual design and Title I, II and III requirements, as applicable (refer to LIR 230-01-02, Graded Approach for Facility Work, located at Official Documents | Inside Los Alamos National Laboratory), assigned to the project.

7.2.2 The **Design Review Manager** shall possess the authority to waive review requirements for particular documents except for the 90% review. The Design Review Manager or his/her designee shall document all waivers.

7.2.3 The **Design Review Manager** shall limit the scope of review for specific items as appropriate.

7.2.4 When conducting a review, the **Team** shall document and disposition all design related comments on a Review Comment Record Form (RCR), (Attachment C).

7.3 Develop and Submit Design Review Request

7.3.1 The appropriate **Task Leader** shall initiate the Design Document Review Request form (Attachment D), submitting the form to the Design Review Manager for review and approval.

7.3.2 The **Design Review Manager** shall then determine the adequacy of design documents for the requested state of review.

7.3.3 The Design Review Manager shall either:

- return the document(s) for additional development prior to review;
- accept the document(s) for review, but modify the stage of review to reflect the level of document completion; or
- accept the document(s) for the requested review

7.3.4 If the Design Review Manager accepts a document for review, the **Design Review Manager** shall distribute copies to the Team and to any additional reviewers if applicable.

7.3.5 The **Design Review Manager** shall schedule a review of design documents as applicable and appropriate.

7.3.6 If review by the full Team is deemed unnecessary for design documents other than drawings and specifications, the **Design Review Manager** may specify the review requirements, specifying performance by either an individual or a Functional Area.

Note: Guidelines for level of design commonly associated with each level of review are included in Attachment F.

7.3.7 The **Design Review Manager** shall schedule a review of design documents, as appropriate.

7.4 Review Design Document

7.4.1 The **Team** shall ensure that all appropriate design inputs within organization's areas of concern were accurately incorporated into design output documents.

7.4.2 If a checklist is needed to ensure completion of a thorough review, the **Team** member, in consultation with Team Leader, shall develop the checklist.

7.4.3 Within the time frame established by the Design Review Manager (generally less than two weeks), each **reviewer** shall review the document based on the general review criteria (Attachment F).

7.4.4 The **Team** may communicate with the Design Agent responsible for preparation of the document to obtain responses to questions prior to formal documentation on a RCR form (Attachment C).

7.4.5 The **Team** shall address comments to specific technical criteria related to the area of their expertise; comments that identify changes required in the document shall include justification or explanation for implementing the change.

7.4.6 The **Design Review Manager** shall assign an action category for comments in accordance with the following criteria:

(A) Comment — Use this action category to record the Design Reviewer's observations or recommendations that are opinions, preferences or outside the Design Reviewer's designated discipline. At the Design Review Manager's option they are incorporated into the document. This action category is not for compliance violations.

(B) Clarification — Use this action category to record deficiencies in clarity of the document or omissions that are not necessarily compliance or criteria violations as defined under "Compliance" below. At the Design Review Manager's option they are incorporated into the document. This action category is not for compliance violations.

(C) Compliance — Use this action category to record specifically referenced code, regulation, standards, or design criteria compliance violations. This action category shall also be used to record deficiencies in clarity of the document that could lead to compliance or criteria violations. This is not for Design Reviewer's opinions or preferences.

7.4.7 If no comments, the **Team** member shall document this fact on an RCR form and submit to the Design Review Manager for review and approval.

7.4.8 The **Team** shall clearly document on the RCR form the page, paragraph, and line number or drawing grid location to which each comment applies.

Note: Attach marked-up photocopies or prints for clarity, if applicable.

7.4.9 If the reviewers produce no comments, the **Design Review Manager** shall document the fact via a memorandum, submitting it to the Design Agent for review.

7.4.10 The **Team** shall produce a single set of record RCR forms for comments associated with design inputs and for transmittal to the Design Agent for resolution.

7.4.11 The **Design Agent** may discuss any or all of the comments with individual Team members for clarification and resolution.

7.5 Disposition Design Review Comment

7.5.1 The **Design Agent** shall document position on all comments by indicating acceptance and methods of incorporation into the design documents or rejection accompanied by a justification for rejection.

7.5.2 The **Design Agent** shall transmit disposition of all comments to the Design Review Manager.

7.5.3 The **Design Review Manager** shall conduct a formal review meeting to present comments for discussion, clarification, and to review and accept the Design Agent's proposed resolutions.

7.5.4 Each member of the **Team** shall attend the review meeting unless the Design Review Manager approves absence of the Team member.

7.5.5 The **Design Review Manager** shall document all clarifications or resolutions on the RCR form.

7.5.6 The **Design Review Manager** shall not issue for construction or issue to agencies or to the public design documents that include unresolved comments, except as specified below.

Note: For a revision 0 document, issuance prior to resolution of all comments may be allowed in special circumstances for bidding purposes only, provided: 1) those items in dispute are not critical to the bidding process and have no effect on cost, or 2) provision can be made in bid documents to account for the disputed item(s) without affecting the validity of bids.

7.5.7 If the comment is valid, but beyond the requirements specified in the baseline documents, the **Team Leader** through the **UTR**, if appropriate, shall provide direction to the Design Agent.

7.5.8 The **Review** member (Team member making and submitting the comment) and the **Design Agent** shall indicate by signatures on the block of the RCR the agreement on the disposition of all comments for design reviews other than the 90% review.

7.5.9 The **Design Review Manager**, the **Reviewer**, and the **Design Agent** shall substantiate agreement on disposition of all comments for 90% design reviews, documented by individual signatures on the form provided in Attachment C.

Note: Subject to verification of incorporation, as required by action step 6.7, these signatures affirm that the Design Agent accurately and appropriately addressed all appropriate design inputs.

7.5.10 The **Design Agent** shall return a copy of the signed, dispositioned RCR form to the Design Review Manager.

7.6 Incorporate and Verify Design Review Comment

7.6.1 The **Design Agent** shall incorporate the comments or other dispositions agreed to, into design documents.

7.6.2 The **Design Agent** shall then submit copies of the design documents to the Design Review Manager and Task Leader.

7.6.3 Upon receipt of the revision 0 design documents, the **Design Review Manager** and the **Task Leader** shall verify the incorporation of all agreed-upon comments or other dispositions and shall document the verification by initialing and dating the form included as Attachment G.

Note: By initialing, the Design Review Manger and the Task Leader affirm the accurate incorporation of all appropriate design inputs into the design output documents.

7.7 Approve Design Document

7.7.1 The **Design Review Manager** shall ensure design document approval according to specific procedures for individual documents.

7.7.2 The **Design Review Manager** shall document Team approval by initialing the RCR forms' verification block.

7.7.3 The **Design Review Manager** shall sign design documents to indicate approval by the Team.

7.7.4 The **Team Leader** shall approve all design documents.

8.0 RECORDS

The **Design Review Manager** shall submit the following records (processed in accordance with LANL-ER-QP-4.4, Record Transmittal to the Records Processing Facility) to the Records Processing Facility.

- Completed design document review request
- Completed review comment records with verification signatures
- Completed review comment records documenting the fact that no comments were produced, if such is the case
- Affirmation of Agreement with 90% review comment dispositions

9.0 LESSONS LEARNED

9.1 Prior to performing work, **ER personnel** should access the DOE lessons learned web page, located at Department Of Energy Lessons Learned and/or the Los Alamos National Laboratory lessons learned web page, located at Lessons Learned to find applicable lessons learns that may aid in the performance of their tasks.

9.2 During the performance of work, **ER personnel**, as appropriate, shall identify, document and submit lessons learned in accordance with LANL-ER-QP-3.2, Lessons Learned, located at http://erinternal.lanl.gov/home_links/Library_proc.shtml.

10.0 ATTACHMENTS

Locate all forms associated with this QP at http://erinternal.lanl.gov/Quality/user/forms.asp.

Attachment A: Qualification Summary Form (1 page)

Attachment B: Design Review Checklist Form (2 pages)

Attachment C: Design Review Comment Record (RCR) Form and Instructions (3 pages)

Attachment D: Design Document Review Request Form (1 page)

Attachment E: Guidelines for Package Content (3 pages)

Attachment F: General Review Criteria (2 pages)

Attachment G: Affirmation of Agreement with 90% Review Comment Dispositions Form (1 page)

Attachment H: Design Review Process Flow Diagram (4 pages)

Qualification Summary

This qualification summary documents and verifies an individual's qualification for a specified design review process.

Note: A check mark (v) indicates the requirement is met. (If the statement does not apply, enter "n/a.")

Project Title/Tech Area/PRS No./Bldg. No.:

Name: (Enter individual's full name)

Position Title: (Enter assigned position title.)

Educational Summary: (Enter the name of the educational institutions attended, major course of study or training, and degree or certificate obtained. List additional formalized education, training, seminars, etc. relevant to the performance of the position [e.g., Design Review Team]. Include additional pages if necessary.)

Experience Summary: (Enter a brief summary of work experience relevant to the assigned position. Include any professional registrations.)

Employment History: (Enter relevant employment history. Reference and attach a as an alternative.)

Attachments:

- ☐ Full Resume
- ☐ Certificates
- ☐ Professional Society List
- ☐ Publications
- ☐ References
- ☐ Other

Concurrence: (The employee shall indicate concurrence of the validity and accuracy of the information entered in this qualification summary.)

(Print name, then sign) (Date)

LANL-ER-QP-6.3, R0	**Los Alamos** **Environmental Restoration**

Design Review Checklist

Note: A check mark (v) indicates the requirement is met. (If the statement does not apply to the review, enter "n/a.")

☐	Are design documents ready for a **30%** review?
☐	Are scoping-meeting minutes compiled and readily available for review?
☐	Is the scope of work for the A/E completed and ready for review and approval?
☐	Are specifications and drawings in "Revision A" status?
☐	Is the quality level determined?
☐	Is the design criteria document complete and ready for review and approval?
☐	Is the engineer's estimate for A/E effort completed?
☐	Is the A/E's proposal for engineering services submitted and reviewed?
☐	Is a record of negotiation established?
☐	Is a comprehensive package schedule (e.g., permitting, rights of entry etc.) developed?
☐	Is a conceptual layout and relationship to project (i.e., to other project facilities) developed?
☐	Is a list of problems, concerns, unknowns, and showstoppers developed?
☐	Is a preliminary list of specifications and drawings (based on initial scope) identified?
☐	Are training requirements determined?
☐	Is a procurement strategy (preliminary) established?
☐	Are ES&H and Waste Management issues identified and addressed?
☐	Is Price-Anderson Amendments Act clearly addressed?
☐	Are design documents ready for a **60%** review?
☐	Are specifications and drawings in Revision A or B status?
☐	Are rough order of magnitude (ROM) dollar variances significant (>50%)?
☐	Is a list of problems, concerns, unknowns and showstoppers developed and identified in the **30**% review addressed and resolved?
☐	Are DOE, EPA, NMED, LANL, and local agency issues addressed?
☐	Are safety issues addressed?
☐	Are Revision A cost estimates developed?
☐	Have technical reference documents been compiled?
☐	Are reference drawings compiled?
☐	Are special conditions identified and addressed?
☐	Are quality assurance and quality control requirements identified and addressed?
☐	Are data gaps and data needs addressed?
☐	Are **30** % review ES&H and Waste Management issues resolved? Are there any **60**% review issues?
☐	Are design documents ready for a **90%** review?
☐	Are specifications and drawings in Revision A, B, or C status (depending on start date)?
☐	Are Revision B cost estimates developed?
☐	Are DOE, EPA, NMED, LANL and local agency issues resolved (final)?
☐	Are the procurement strategy and scheduled finalized?
☐	Is a list of submittals developed?

LANL-ER-QP-6.3, R0	**Los Alamos** **Environmental Restoration**

Design Review Checklist (Cont.)

Note: An entered check mark (v) indicates the requirement are met. (If the statement does not apply to the review, enter "n/a.")

☐	Are "Hold and Witness Points" identified?
☐	Are instructions to bidders submitted?
☐	Is a pricing schedule established?
☐	Are QA and QC requirements finalized?
☐	Are the HASP and HASSP reviewed, finalized, and approved?
☐	Is the Statement of Work for the bid package developed, reviewed, and approved?
☐	Is A/E scope of work/proposal for construction support developed?
☐	Is the **60**% design sign-off completed?
☐	Is the Affirmation of Agreement form signed off?
☐	Is final resolution of all open issues completed?
☐	Is a strategy for handling unresolved issues addressed prior to start of construction?
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Design Review Manager: _____

(Print name, then sign) (Date)

Design Review Comment Record Form

(Use black ink to complete this form)

Part 1: (The Design Agent completes.)

Project Title/Tech Area/PRS No./Bldg. No.	Project ID Number:	Design Title Level:
From: (Design Agent Name/Organization/Telephone No./Email/Fax:		Submittal Date:

Review meeting date and location:

Please complete review comment form and return to by .

Description of review document: ☐ Engineering Study ☐ 30% Design ☐ 60% Design ☐ 90% Design
☐ Design Criteria ☐ Design Build Performance ☐ Design Change ☐ Other

Part 2: (The Design Reviewer completes.)

To: (Mail Stop)	**Design Reviewer (print name)**	**Discipline**	**Organization**	**Initials**	**Date**

Comment No.	Drawing, Spec, or Page No.	Reviewer's Comments **(Attach additional numbered pages as required)**	Action **(A, B, C)**	Comment Disposition **+ = Incorporated** **- = Not Incorporated** **(Explain)**	Reviewer's Acceptance **(yes/no, initials)**

Part 3: (The Design Agent and the Design Review Manager complete.)

Design Agent: _____
(Print name, then sign) (Date)

Design Review Manager: _____
(Print name, then sign) (Date)

LANL-ER-QP-6.3, R0 **Los Alamos Environmental Restoration**

Review Comment Record (RCR) Form Instructions

Part 1: (Design Agent completes.)

1. Enter project title, technical area location, PRS number, and building number (if applicable).
2. Enter the Project ID number and the "Design Title Level (e.g., Title I, II, III)".
3. Enter the design agent's organization name, telephone/fax number and email address.
4. Enter the review-comment, record form submittal date.
5. Enter the review meeting date and location. Include a review-comment, return date and to whom it should go.
6. Enter the description of the document to be reviewed i.e., engineering study, and 30%, 60%, 90% design, design criteria, design build performance, design change or other. If other is selected, enter an explanation.

Part 2: (Design Reviewer completes.)

7. Enter a sequential number for all comments.
8. Enter the drawing, specification and/or page location that the review comment applies to.
9. Enter a descriptive review comment, as applicable.
10. Enter an action (A, B, or C) for each comment.
11. Enter a comment disposition (i.e., comment incorporated or comment not incorporated, with an explanation).
12. Enter a "Yes" or "No", and initials in the reviewer's acceptance column.

Part 3: (Design Agent and the Design Review Manager complete.)

13. Design Agent: Print name, then sign and enter the current review date.
14. Design Reviewer Manager: Print name, then sign and enter the current review date.

General Guidance Information

1. Attach additional numbered pages as necessary.
2. Sign and date in "Design Reviewed By" block.
3. Send RCR to the design reviewer by the requested date
4. At the review meeting, explain comments and discuss possible resolutions as necessary based on comments.
5. Review the disposition of your comments and indicate acceptance or rejection on the RCR.
6. Contact design reviewer for resolution of unacceptable dispositions.
7. The RCR shall be used for: 1) routing design documents to the Design Reviewer; and 2) recording the recommended action and review comments of each Design Reviewer. The RCR shall be completed and returned prior to the review meeting stated on the RCR. The Design Review Manager shall decide how to process comments.

Design Reviewer (Design Review Team) responsibilities and duties:

1. Upon receipt of the RCR, initial the routing list and indicate the RCR receipt date.
2. Review the design for compliance with specified design criteria, codes, regulations, DOE Orders and standards, LANL Engineering Manual, and best-practice standards.
3. Review the design for adequacy to economically fulfill its intended operational function. (The reviewer should attempt to identify these issues in the design reviews BEFORE the Review Meeting.)
4. Review the design for constructability and maintainability.
5. Record comments, clarification questions, compliance issues, recommended corrective actions, and other results of the review in the Reviewer's Comments section of the RCR.
6. Indicate in the appropriate column the comment number, specific drawing, specification, text page reference, the comment, and action category (A, B, or C) for each. Assign action category in accordance with the following criteria:

   (A) Comment: Use this action category to record the Design Reviewer's observations or recommendations that are opinions, preferences or outside the Design Reviewer's designated discipline. It is the Design Review Manager's option to incorporate into the document. This action category is not for compliance violations.

   (B) Clarification: Use this action category to record deficiencies in clarity of the document or omissions that are not necessarily compliance or criteria violations as defined under "Compliance" below. It is the Design Review Manager's option to incorporate into the document. This action category is not for compliance violations.

   (C) Compliance: Use this action category to record specifically-referenced code, regulation, standards, or design criteria compliance violations. Also use this action category to record deficiencies in clarity of the document that could lead to compliance or criteria violations. This is not for Design Reviewer's opinions or preferences.

7. Each additional comment page shall be identified with the project name, project ID number, and a page number. Enter the total number of comment pages, including the RCR, on the line provided at the bottom of the RCR.
8. Sign and date the RCR in "Design Reviewed By" block and send to the Design Agent and the Design Review Manager.
9. Attend the review meeting. Explain comments as required. Discuss possible resolutions.
10. The Design Review Manager shall notify the Design Reviewers regarding the disposition of Final Review "compliance" comments.
11. Indicate your acceptance or rejection of the disposition of each of your comments.

Design Document Review Request Form

(Request for Design Review Team review.)

Part I: (Task Leader completes.)		Date:
Project Title/Tech Area/PRS No./Bldg. No.:	Project ID Number:	Design Title Level:

Description of document to review: ☐ Engineering Study ☐ 30% Design ☐ 60% Design ☐ 90% Design
☐ Design Criteria ☐ Design Build Performance ☐ Design Change ☐ Other (explain)

Requested Review date:
Please complete the review of the attached design document(s) and return to by .

Task Leader: _____
(Print name, then sign.) (Date)

Part II: (Design Review Manager completes.)

Design Document Numbers(s):	Reference Documents:

Additional Information, Special Instructions, etc.:

Design Review Manager: _____
(Print name, then sign) (Date)

Part III: (Responsible Team Leader completes.)

Functional Area Leader: _____
(print name, then sign) (Date)

LANL-ER-QP-6.3, R0	**Los Alamos** **Environmental Restoration**

Guidelines for Package Content and Milestone Review

Engineering Discipline	First Milestone Review (30%) ☐	Second Milestone Review (60%) ☐	Final Milestone Review (90%) ☐
Process Engineering	All process equipment identified/sized. Layouts and flow diagrams complete. All effluents have been qualified. All safety systems identified.	All control parameters specified. Process equipment and system drawings 100% complete. All calculations complete. All safety system components identified.	All work complete and checked.
Architectural	Plans – 85% complete except notes, dimensions, and sections; Sections 70%; Elevations 70%; Details 40%; Schedules 70%.	Plans 95%; Sections 95%; Elevations 95%; Details 60%; Schedules 95%.	All work complete and checked.
Civil	Grading plan 90%; Site Plan with utilities 90%; Typical road section calculations 75%.	Plans 95%; Sections and details 75%; Calculations 90%.	All work complete and checked.
Structural	Calculations 85% to match architectural progress and support system concept; Drawings should show basic framing system typical Foundation plan.	Calculations substantially complete, including check.	All structural work complete.
Instrumentation	Instrumentation system diagram and tabulation. Control room layout and general instrumentation system field layout. Computer or data acquisition specification draft. Design calculations	Control loop diagram. Control and computer panel. Instrumentation specifications. Interconnections-tubing and cabling. Computer and data acquisition specification. First milestone review comments incorporated.	All work complete and checked.
Electrical	Initial start of one-line diagram, legend, and notes. Basic power and lighting plan. General layout of electrical distribution – interior and exterior. Locations of substation feeders, switchgear, panel boards. etc. Preliminary typical layout of lighting and receptacle arrangements, locations of control devices, motors, and fire alarm devices. Electrical calculations.	Power and lighting plan 60%. One line diagrams legend and notes 60%. Panel schedules, details 60%. Layout of electrical distribution system including all branches. Circuits, home runs, panel schedules switchgear and motor control center details 60%. One line diagram, lighting, layout, controls and general details 100%. General layout of alarm systems and communication systems 100%. Calculations 100%.	All work complete and checked.
LANL-ER-QP-6.3, R0			**Los Alamos Environmental Restoration**

Guidelines for Package Content and Milestone Review (continued)			
Engineering Discipline	**First Milestone Review (30%) ☐**	**Second Milestone Review (60%) ☐**	**Final Milestone Review (90%) ☐**
Environmental Control	Calculations 70%; schematics showing major components, general arrangements and flow patterns of each system 90%. Brief tabulation of major equipment data, etc. Materials of construction. Brief functional requirements (temperatures, flows, etc.). Specify expected delivery period from placement of order. Listing of drawings and data sheets and/or specifications.	Rough draft of specifications, fans, refrigeration units, etc. Electrical loads should be finalized; Plans 80%, Elevations 80%; Sections 60%; Details 60%. Schematics and Engineering flow diagram completed. Physical arrangement of drawing complete (plan view). Identify in tabular form, work planned to completed drawings; control diagram 70%; demolition drawings 100%.	All work complete and checked. Schedules 80%. Completed calculations updated.
Piping	Calculations 70%; Schematics showing major components, general arrangements and flow patterns of each system 90%. Brief tabulation of major equipment data: Equipment size i.e., size, capacity, physical data, etc. Materials of construction. Brief functional requirements. Specify expected delivery period from placement of order. All data sheets and specifications for advance procurement complete.	Rough draft of specifications, pumps, compressor, etc. Electrical loads should be finalized. Plans 80%; Sections 60%; Details 60%; Schedules 80%. Completed calculations updated. Schematics and engineering flow diagram completed. Physical arrangement on drawing completed (plan view). Identify work planned to complete drawings in tabular form. Control diagrams 60%.	All work completed and checked.
Cost Estimating	Project construction work plan by participant complete. Project cost contract plan complete. Construction craft and crew rates complete. Basis for cost estimate complete. Establish miscellaneous costs, indirect costs, job factors, construction support activity and other costs that will have an impact on the project construction work costs for each participant 95% complete. Project summary work breakdown (PSWBS) complete. Cost codes 95% complete. Architectural, structural and civil cost estimate 95% complete.	Miscellaneous cost determinations complete. Architectural, structural, and civil costs estimate complete. Electrical, instrumentation piping and environmental control cost estimate 90% complete. All unit prices established. Design quantity take off complete. Deviations from budget estimate identified and rationalized.	Determine contingency and escalation to be applied, if any. Cost codes complete.
LANL-ER-QP-6.3, R0			**Los Alamos Environmental Restoration**

Guidelines for Package Content and Milestone Review (continued)

Engineering Discipline	First Milestone Review (30%) ☐	Second Milestone Review (60%) ☐	Final Milestone Review (90%) ☐
Cost Estimating (continued)	Electrical, instrumentation piping and environmental control bill of materials up to date with design status and priced out. Title I cost estimate complete.		Determine contingency and escalation to be applied, if any. Cost codes complete
Construction	Provide information for assessment of problem areas. Coordinate with site development plan and schedule.	Review for safety or operating hazards involving construction (Price Anderson Amendments Act). Review for construction methods, construction economics and accessibility. Review for start of preparation of special conditions. Review bid schedule and method of payment. Review schedule and milestones.	Review for safety, etc. (see item under 60% review). Completeness of total design as needed for contracting purposes. Review for errors, ambiguities, clarity, and interference. Review of operational plans (ensure that work specified will provide minimum interferences and conflicts with ongoing activities during construction). Review construction methods, access size of openings, etc., for adequacy and practicality. Review definition of and availability of government furnished items (also provide for proper identification, storage, and release to contractor in an orderly manner). Review for storage facilities, temporary facilities, security boundaries, temporary electrical, utility services, and parking as related to the subcontractor's activities.

General Review Criteria

Review documents to determine the following:

1. Correct approach.
2. Identified and adequately stated assumptions and limitations.
3. Clearly identified speculative statements.
4. Appropriate and useful figures, tables, and maps agree with sources, consistent with text, and prepared so that all locations in text shown on maps or adequately described.
5. References and inputs agree with sources and available to the public.
6. Demonstrates accurate, mathematical expressions, correct computations, and clearly and correctly stated results.
7. Data supports the interpretations and conclusions.
8. Use of baseline data where available.
9. Sound conclusions meet the work objective.
10. Document's intended use suitable and appropriate.
11. Specified materials are compatible with each other and the design environmental conditions of the exposed material.
12. Suitable specified parts, equipment, and processes for the required application.
13. Design properly considers protection of the public, the operating personnel, and the environment, and conforms to applicable worker and environmental protection laws, regulations, and standards.
14. Sufficient acceptance criteria incorporated in the Design documents to allow verification that the subcontractor satisfactorily accomplished design requirements.
15. Economically constructible Design.
16. Specification of appropriate quality assurance and quality control requirements.
17. Design properly considers all applicable and/or relevant and appropriate requirements, FONSI, EE/CA, and any other regulatory compliance agreements or documentation.
18. Design documents adequately support facility design, construction, turnover, startup, and operation.

Affirmation of Agreement with 90% Review Comment Dispositions

Project Title/Tech Area/PRS No./Bldg. No.:	Project ID Number:	Design Title Level:	Date:
Additional Information (as appropriate):			

Reviewers Complete: ***We, the undersigned, do affirm that the responsible Team Leader and the University Technical Representative accurately and appropriately addressed design inputs identified for this design review.***

Design Review Manager: _____
(Print name, then sign) (Date)

Quality Program Project Leader: _____
(Print name, then sign) (Date)

Safety: _____
(Print name, then sign) (Date)

Regulatory Compliance: _____
(Print name, then sign) (Date)

Team Leader: _____
(Print name, then sign) (Date)

BUS-8: _____
(Print name, then sign) (Date)

UTR: _____
(Print name, then sign) (Date)

Task Leader: _____
(Print name, then sign) (Date)

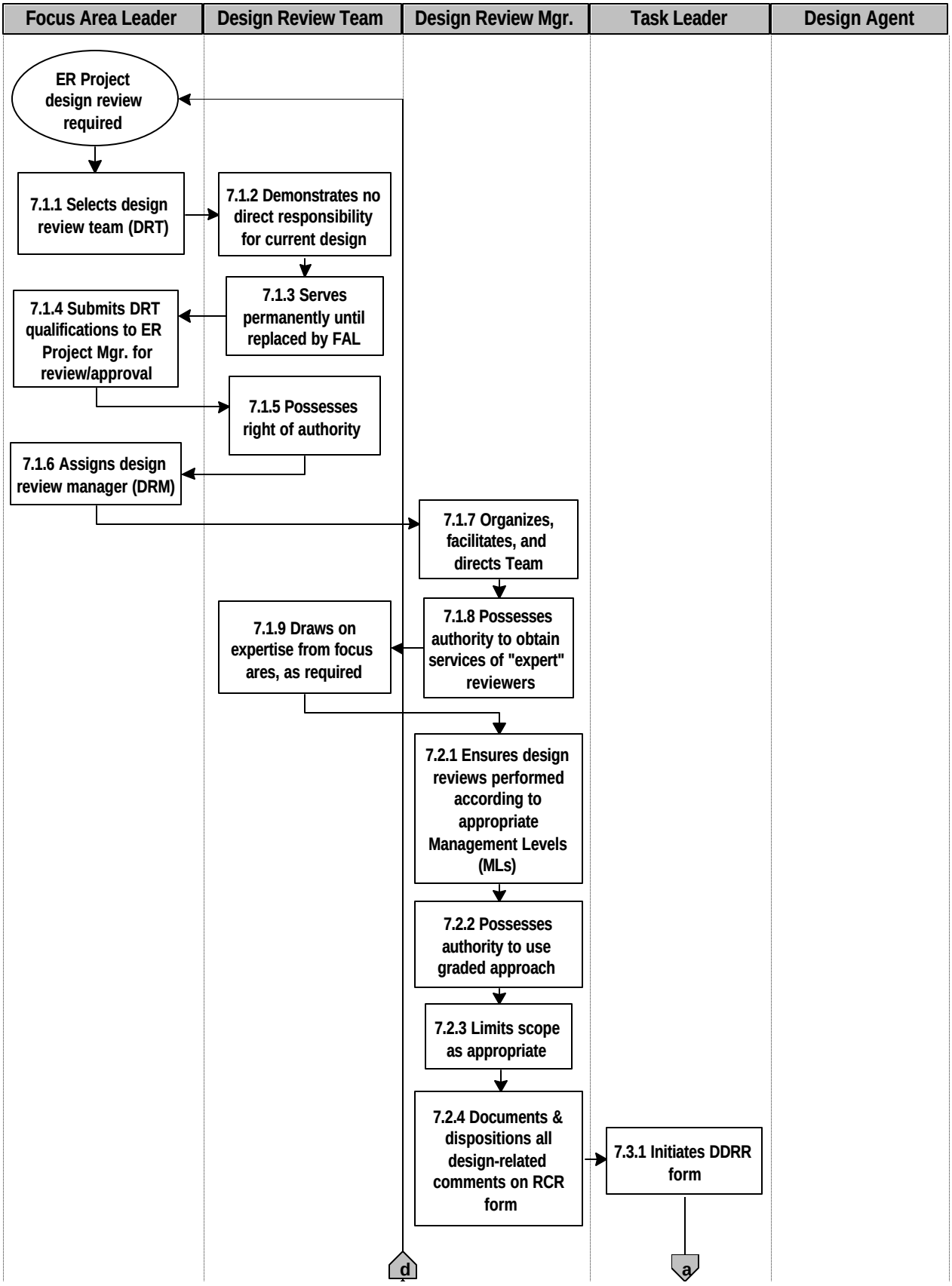
Other: _____
(Print name, then sign) (Date)

Other: _____
(Print name, then sign) (Date)

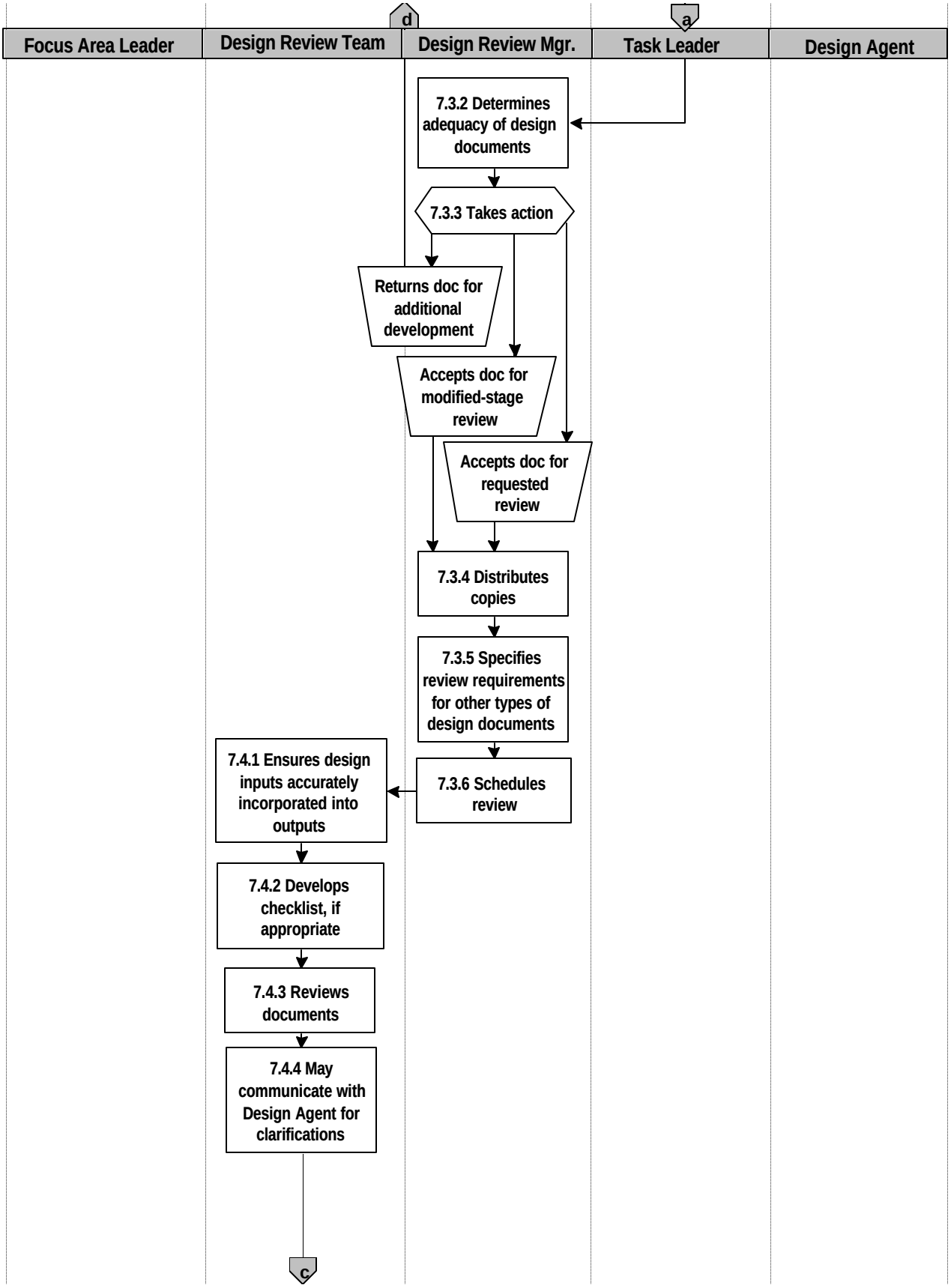
Other: _____
(Print name, then sign) (Date)

LANL-ER-QP-6.3, R0	**Los Alamos** **Environmental Restoration**

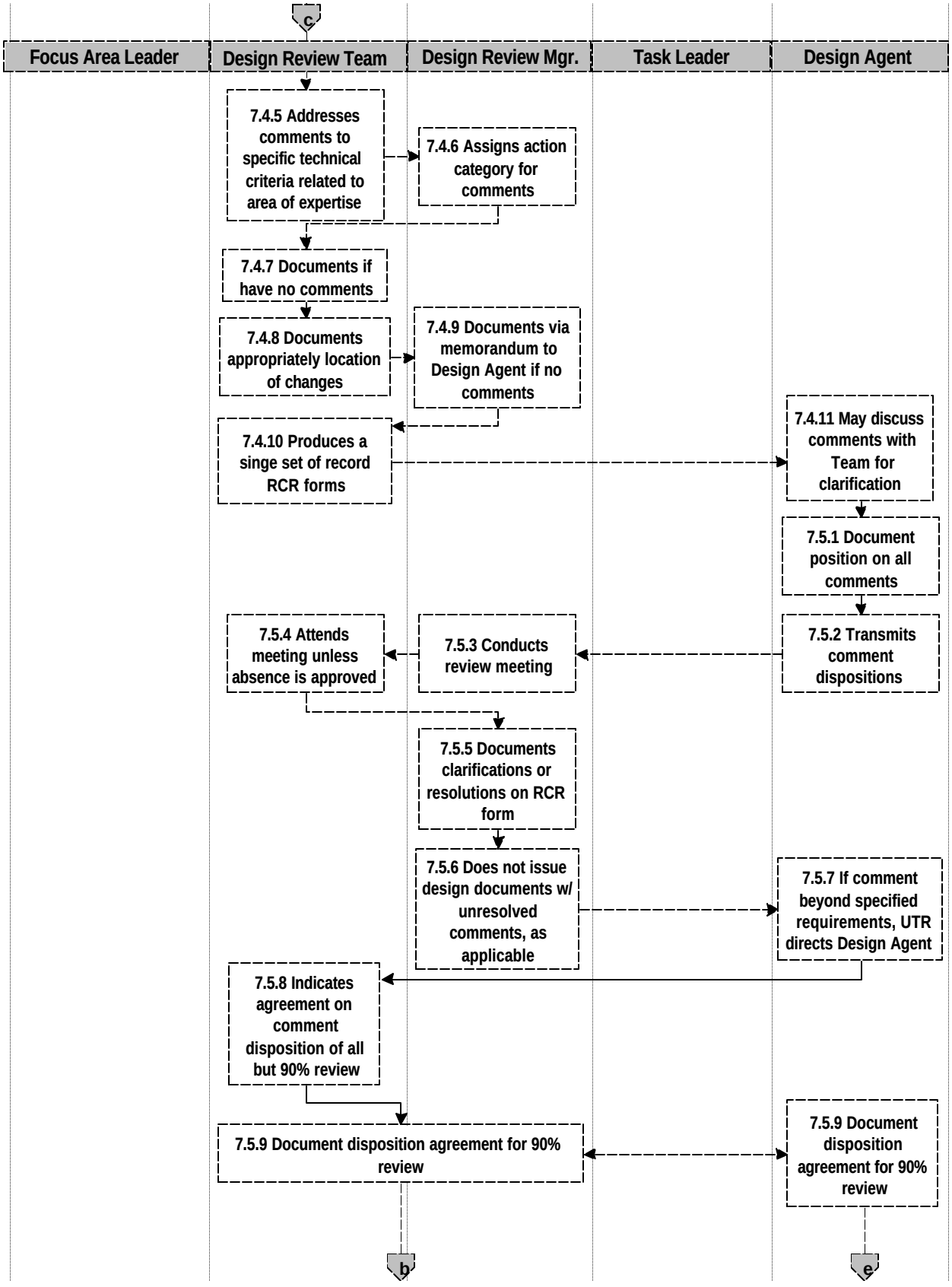
Detailed Design Review Process Flow Diagram



Detailed Design Review Process Flow Diagram (Cont.)



Design Review Process Flow Diagram (Cont.)



Detailed Design Review Process Flow Diagram (Cont.)